Operating Instructions
Field Evaluation Unit
CES-FD-AP-M-01-... (Multicode)
CES-FD-AP-U-01-... (Unicode)

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About this manual

This manual is valid for all field evaluation units CES-FD-AP-M-01-… (Multicode) and CES-FD-AP-U-01-… (Unicode).

Correct use

The field evaluation units series **CES** are safety devices for monitoring movable safety guards.

The complete safety system consists of three components:

coded actuator (transponder), read head and field evaluation unit.

- In combination with a separating safety guard and the machine control, this safety system prevents dangerous machine movements from occurring while the safety guard is open. A stop command is triggered if the safety guard is opened during the dangerous machine function.

Before safety components are used, a risk assessment must be performed on the machine, e. g., in accordance with:

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction
- IEC 62061, Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems.

Correct use includes compliance with the relevant requirements for installation and operation, for example

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN 1088, Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
- EN 60204-1, Safety of machinery. Electrical equipment of machines. General requirements
- EN 60947-5-3, Specification for low-voltage switchgear and controlgear. Control circuit devices and switching elements. Requirements for proximity devices with defined behavior under fault conditions

The unit must be used only in conjunction with the CES read heads and CES actuators from EUCHNER. On the use of different actuators, EUCHNER provides no warranty for safe function.

Important!

- The user is responsible for the integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- In the estimation of the PL for the overall system, a maximum value of 100 years can be assumed for the $MTTF_d$ according to the limit value in EN ISO 13849-1:2008, section 4.5.2. This corresponds to a minimum value for the PFH_d of $2.47x10^{-8}$/h.
- Correct use requires observing the permissible operating parameters (see Technical data).
- If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.
- It is only allowed to use components that are permissible in accordance with the table below.

Possible combinations for CES components

Field evaluation unit	Read head	Actuator	
		CES-A-BMB 077791	**CKS-A-BK1-RD** 113461
CES-FD-AP-M-...	**CES-A-LMN-SC** 077790	●	
	CKS-A-L1B-SC-SC 113130		**Important**: Key adapter CKS must not be used as a lockout mechanism in combination with multi-code evaluation.
CES-FD-AP-U-...	**CES-A-LMN-SC** 077790	●	
	CKS-A-L1B-SC-SC 113130		●

Key to symbols	●	Combination possible

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

General safety instructions

Safety switches fulfill personal protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the safety guard particularly

- after any setup work
- after the replacement of a CES component
- after an extended period without use
- after every fault

Independent of these checks, the safe function of the safety guard should be checked at suitable intervals as part of the maintenance schedule.

Warning!

Danger of fatal injury in the event of incorrect connection or incorrect use.

- Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.
  On this topic pay attention in particular to the measures for reducing the possibility of bypassing from EN 1088:1995+A2:2008, section 5.7.

The device is only allowed to be installed and placed in operation by authorized personnel

- who are familiar with the correct handling of safety components
- who are familiar with the applicable EMC regulations
- who are familiar with the applicable regulations on health and safety and accident prevention
- who have read and understood the operating instructions

Important!

Prior to use, read the operating instructions and keep these in a safe place. Ensure that the operating instructions are always available during mounting, setup and servicing work. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required. For this reason you should archive a printed copy of the operating instructions. If you should lose the operating instructions, you can download this document from www.EUCHNER.de.

Function

Field evaluation units series CES-FD-AP make it possible to evaluate CES read heads in the field. The safety outputs on the field evaluation units are connected to the machine control.

The system meets the following safety requirements:

- Safety category 4, PLe according to EN ISO 13849-1
- Redundant design of the circuit in the unit with self-monitoring
- This means that the safety system still functions even if an internal component fails
- The switch state of the semiconductor outputs is continuously monitored internally
- Short circuit detection at the safety outputs by pulsed signals

The following switch-on condition applies for the safety outputs FO1A and FO1B (see also *System state table* and section *Typical system times*):

- Safety guard closed

The system consists of three components: coded actuator (transponder), field evaluation unit and read head.

The read head is connected to the field evaluation unit and reads the actuator code.

Every EUCHNER actuator supplied has an electronic coding (unique coding) that is read by the read head. Only if a correct coding is detected does the system accept the actuator. The code in an actuator cannot be reprogrammed.

Unlike systems with unique code detection, on multicode systems a specific code is not requested but instead it is only checked whether the actuator is of a type that can be detected by the system (multicode detection). There is no exact comparison of the actuator code with the code defined in the safety switch (unique code detection).

The read head is fastened to the fixed part of the safety guard.

The actuator attached to the movable part of the safety guard is moved towards the read head by closing the door. The read head is connected to the field evaluation unit. When the switch-on distance is reached, power is supplied to the actuator by the read head by induction and data can be transferred.

If a permissible code is detected, the safety outputs are released.

Due to the combination of dynamic polling of the actuator and the redundant, diverse design of the safety electronics with the two feedback safety outputs, the safety switch will enter the safe state with every detectable fault.

When the safety guard is opened, the safety outputs switch off the safety circuit and the monitoring output OD (optional) is switched off. The state of the safety outputs is monitored internally by two microprocessors.

If faults are detected, the safety circuit is switched off and the DIA LED illuminates. In case of devices with a monitoring output OI, the output is switched on.

The field evaluation unit has a redundant switching design with self-monitoring. This means that the safety system is still effective even if a component fails.

The system is designed so that failures will not result in the loss of the safety function. The occurrence of failures is detected by cyclic self-monitoring at the latest on the next demand to switch on the safety outputs (e.g. on starting).

If the safety door with the actuator should settle over time, the actuator can drift out of the read head operating distance. The device recognizes this situation and indicates that the actuator is in the limit range. This allows the safety door to be readjusted in time.

Mounting

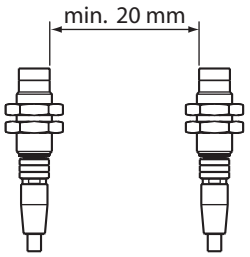
Caution!

Risk of damage to equipment as a result of incorrect installation. The read head must not be used as a mechanical end stop.

- Fit an additional end stop for the movable part of the safety guard.

Important!

- From the assured switch-off distance S_{ar}, the safety outputs are safely shut down.
- When mounting several read heads, observe the stipulated minimum distance to avoid mutual interference.
  - For CES-A-LMN s_{min} = 20 mm



Note the following points:

- Actuator, read head and field evaluation unit must be easily accessible for inspection and replacement.
- The switching operation must only be triggered by the specific actuator designated for this purpose. For permissible combinations please see the table of possible combinations on page 4.
- Actuator and read head must be fitted so that
  - the front faces are at the minimum switch-on distance 0.8 x S_{ao} or closer when the safety guard is closed (see section *Operating distances*). A minimum distance dependent on the actuator must be maintained for a side approach direction: - For CES-A-LMN 1.2 mm
  - when the safety guard is open up to the distance S_{ar} (assured switch-off distance), a hazard is excluded.
  - the actuator is positively mounted on the safety guard.
  - pay attention to the maximum tightening torque for the field evaluation unit mountings of 1 Nm.

Electrical connection

Warning!

In case of an error, loss of the safety function through incorrect connection.
- To ensure safety, both safety outputs (FO1A and FO1B) must always be evaluated.
- Monitoring outputs must not be used as a safety output.
- Lay the connection cables with protection to prevent the risk of short circuits.

Caution!

Risk of damage to equipment or malfunctions as a result of incorrect connection.
- The device generates its own clock signal on the output lines FO1A/FO1B. A downstream control system must tolerate these test pulses, which may have a duration of up to 0.4 ms.
  No pulses are output when the safety outputs are switched off.
- The inputs on an evaluation unit connected must be positive-switching, as the two outputs on the safety switch deliver a level of +24 V in the switched-on state.
- All the electrical connections must either be isolated from the mains supply by a safety transformer according to IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent isolation measures (PELV).
- The device tolerates voltage interruptions in the operating voltage U_B of up to 5 ms. Voltage interruptions at U_B are also output on the safety and monitoring outputs.
- For use and operation as per the cULus requirements, a power supply with the feature "for use in class 2 circuits" must be used. The same requirement applies to the safety outputs.
  Alternative solutions must comply with the following requirements:
  a) Electrically isolated power supply unit with a max. open-circuit voltage of 30 V/DC and a limited current of max. 8 A.
  b) Electrically isolated power supply unit in combination with fuse as per UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V/DC voltage section.
- All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. RC interference suppression units must not be used.
- Power devices which are a powerful source of interference must be installed in a separate location away from the input and output circuits for signal processing. The cable routing for safety circuits should be as far away as possible from the cables of the power circuits.
- In order to avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard EN 60204-1:2006, section 4.4.2 (EMC).

Important!

If the device does not appear to function when operating voltage is applied (e.g. green STATE LED does not flash), the safety switch must be returned unopened to the manufacturer.

Particularities for operation on decentralized peripheral systems

The version CES-FD-AP-...-.SI-... (M12, 5-pin; pin 5 not assigned) is optimized for connection to decentralized peripheral systems, such as the ET200 series from Siemens. The devices are connected like an OSSD (e.g. like light curtains).

The 5-pin M12 plug connector can be connected directly to the socket of an IP65 field module (e.g. ET200pro) with aid of the connection cables on page 25. If flying leads are used, connection to IP20 input and output modules (e.g. ET200s) is naturally also possible.

Important!

Observe the following notes prior to connection:
- Parameter assignment might be required for the input/output modules (see application example at www.EUCHNER.de, in the area Download ▶ Applicationen ▶ CES).
- Additionally observe notes from the control system manufacturer where necessary.

Safety in case of faults

- The operating voltage U_B is reverse polarity protected.
- The contacts FO1A/FO1B are short circuit-proof.
- A short circuit between FO1A and FO1B is detected by the device.
- A short circuit in the cable can be excluded by laying the cable with protection.

Fuse protection for power supply

The power supply must be provided with fuse protection depending on the current required for the outputs. The following rules apply:

Max. current consumption of a switch I_{max}

I_{max} = I_{UB} + I_{OD} + $I_{FO1A+FO1B}$

I_{UB} = Switch operating current (45 mA)

I_{OD} = Monitoring output load current (max. 50 mA)

$I_{FO1A+FO1B}$= Load current safety outputs FO1A + FO1B (2 x max. 150 mA)

Requirements for connection cables

Caution!

Risk of damage to equipment or malfunctions as a result of incorrect connection cables.

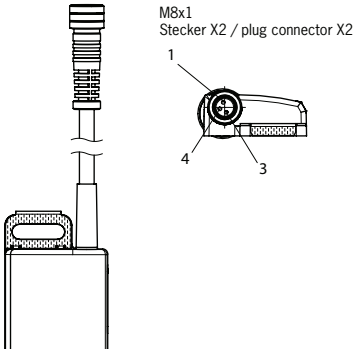
- Use connection components and connection cables from EUCHNER
- On the usage of other connection components, the requirements in the following table apply. EUCHNER provides no warranty for safe function in case of failure to comply with these requirements.
- The connection cable for the field evaluation unit must not be longer than 180 m in total.
- The connection cable from the field evaluation unit to the read head is only allowed to be extended with the aid of the extension (order no. 115464).
- The read head cable must not be longer than 0.7 m in total.

Observe the following requirements with respect to the connection cables for the connection of the device:

Parameter	Value	Unit
Conductor cross-section min.	0.14	mm²
R max.	150	Ω/km
C max.	120	nF/km
L max.	0.65	mH/km
Recommended cable type	LIYY 8x or 5x0.14 mm²	

Connector assignment and wire color for field evaluation unit CES-FD-AP-.-01...

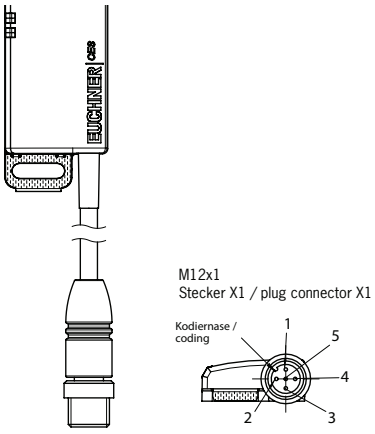
Connection for the read head (M8, 3-pin)

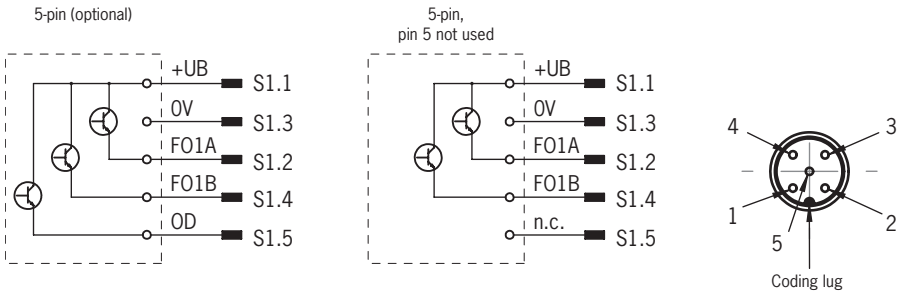


Pin	Designation	Description	Wire color
1	H1	Data wire	BN
3	H2	Data wire	WH
4	SH	Screen	-

The switch has a permanently connected piece of cable approx. 200 mm long. With the aid of an extension piece (order. no. 115464) the read head connection can be extended to max. 700 mm.

Device connection for the field evaluation unit with M12 plug connector, 5-pin





View of connection side on the field evaluation unit

Figure 2: Pin assignment, connection cable for the field evaluation unit with M12 plug connector

Pin		Designation	Description	Wire color
5-pin	5-pin pin 5 not used			
1	1	UB	Power supply, DC 24 V	BN
2	2	FO1A	Safety output, channel 1	WH
3	3	0V	Ground, DC 0 V	BU
4	4	FO1B	Safety output, channel 2	BK
5	-	OD	Monitoring output (optional)	GY

Connection

Connect the device as shown in Figure 3.

Important!

The subsystem CES-FD-AP complies with PL e in accordance with EN 13849-1. To integrate the subsystem in a category 3 or 4 structure, it is necessary to monitor the downstream load (the feedback loop must be monitored).
These examples show only an excerpt that is relevant for connection of the CES system. The example illustrated here does not show complete system planning. The user is responsible for safe integration in the overall system.

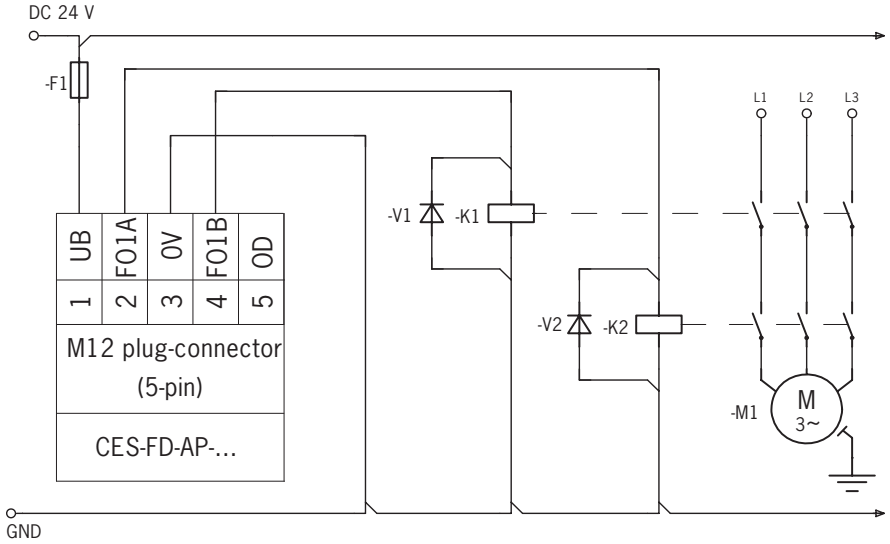


Figure 3: Connection example CES-FD-AP...

Warning!

In case of an error, loss of the safety function through incorrect connection.

- To ensure safety, both safety outputs (FO1A and FO1B) must always be evaluated. Single-channel use of the safety outputs leads to a loss of the category in accordance with EN ISO 13849-1.

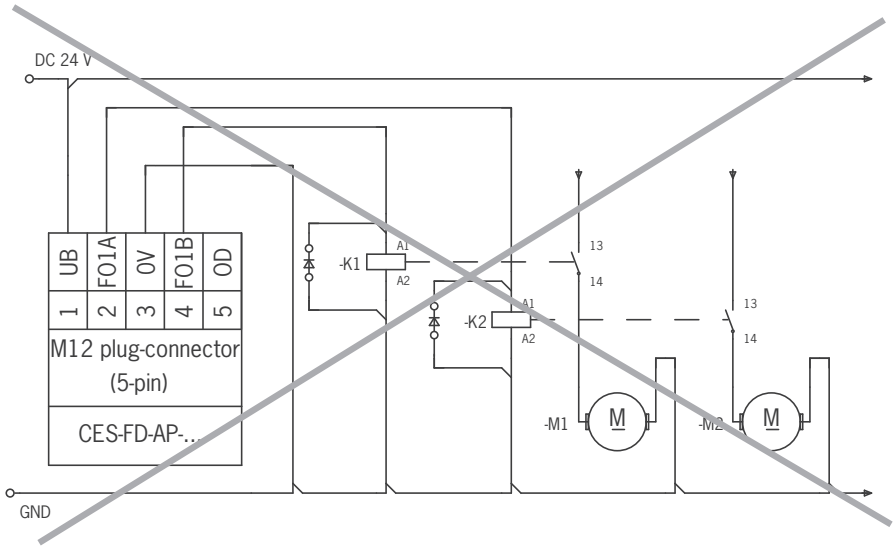


Figure 4: Example of incorrect connection.

Connecting a CES-FD-AP-...-.SI-... to a decentralized peripheral system (e.g. ET200 series from Siemens)

Please observe the notes in section “Particularities for operation on decentralized peripheral systems” on page 9 before connecting the device.

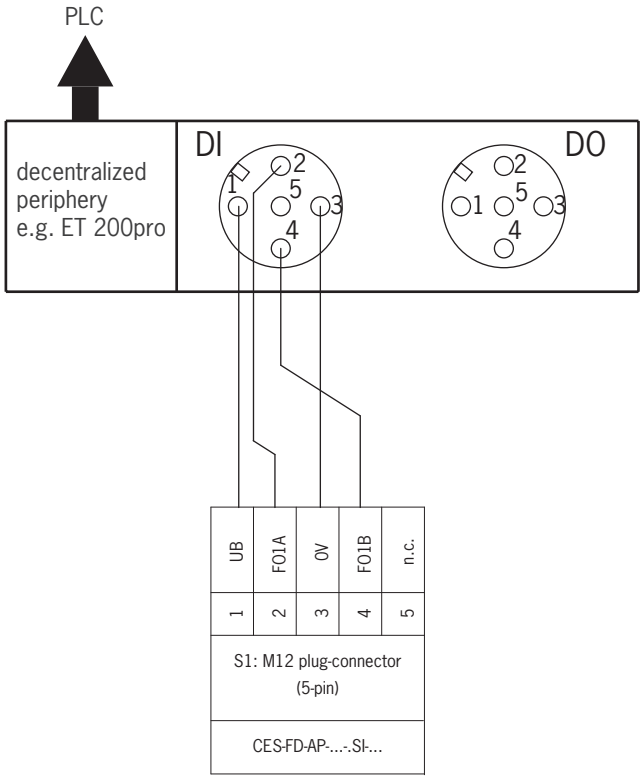


Figure 4: Connection example for version for connection to decentralized peripheral systems (here: ET200pro)

Setup

LED indicators

LED	Color	State	Significance
STATE	green	illuminated	Normal operation: Door closed
		flashing	- Door open - Actuator in the limit range (further signal functions see status table)
DIA	red	illuminated	- Internal electronics fault - Fault at the inputs/outputs

Teach-in function for actuator (only version Unicode)

The actuator must be allocated to the safety switch using a teach-in function before the system forms a functional unit.

During a teach-in operation, the safety outputs and the monitoring output OD (optional) are in a high-resistance state, i.e. the system is in the safe state.

Important:

- The safety switch disables the code of the previous actuator if teach-in is carried out for a new actuator. Teach-in is not possible again immediately for this actuator if a new teach-in operation is carried out. The disabled code is deleted again in the safety switch only after a third code has been taught.
- The safety switch can only be operated with the last actuator taught.
- If the switch detects an actuator which has already been taught when in teach-in standby state, this state is ended immediately and the switch changes to normal state.
- The actuator being taught is not activated if it is within the operating distance for less than 60 s.

Actuator teach-in

1. Apply operating voltage to the safety switch.

➡ A self-test is performed for approx. 0.5 s. After this, the LED flashes cyclically three times and signals that it is in standby state for teach-in. Standby state for teach-in remains active for approx. 3 minutes.

2. Move new actuator to the read head.

➡ Teach-in operation starts, green LED flashes (approx. 1 Hz). During teach-in, the safety switch checks whether the actuator is a disabled actuator. Provided this is not the case, the teach-in operation is completed after approx. 60 seconds, and the green LED goes out. The new code has now been stored, and the old code is disabled.

3. To activate the new actuator code from the teach-in operation in the safety switch, the operating voltage to the safety switch must then be switched off for min. 3 seconds.

Setup (only version Multicode)

1. Apply operating voltage to the device.

➡ The green LED flashes briefly and a self-test is performed.
After this, the LED flashes cyclically one time and signals that it is in standby state.

2. Move actuator to the read head (observe distance < S_{ao}).

➡ The green LED illuminates continuously and indicates the detection of the actuator.

If the green LED is flashing in fast flashing sequences, the actuator is in the limit range. In this case the safety guard must be re-adjusted such that the actuator is completely in the read area.

Functional check

After installation and any fault, the safety function must be fully checked. Proceed as follows:

Warning!

Danger of fatal injury as a result of faults in installation and functional check.
- Before carrying out the functional check, make sure that there are no persons in the danger area.
- Observe the valid accident prevention regulations.

1. Switch on operating voltage.

- The STATE LED then flashes at regular intervals.

2. Close all safety guards.

- The machine must not start automatically.
- The green STATE LED illuminates continuously.

3. Enable operation in the control system.

4. Open the safety guard.

- The machine must switch off and it must not be possible to start it as long as the safety guard is open.
- The green LED STATE flashes at regular intervals.

Repeat steps 2-4 for each safety guard.

System status table for version Multicode

Operating mode	Actuator/ guard position	Safety outputs FO1A and FO1B	LED indicator output: STATE (green)	LED indicator output: DIA (red)	State
Normal operation	closed	on	✳	○	Normal operation, door closed
	closed	on	✳ flashes quickly 2 Hz	○	Normal operation, door closed, actuator in limit range ➡ Re-adjust door
	open	off	✳ 1 x	○	Normal operation, door open
Fault display	X	off	○	✳	Fault on the power supply (e.g. Switch-off pulse duration of clocked power supply too long)
	closed	off	✳ 3 x	✳	Defective actuator (e.g. fault in code or code not readable)
	X	off	✳ 4 x	✳	Output error (e. g. short circuits, loss of switching ability)
	X	off	✳ 5 x	✳	Internal fault (e.g. component faulty, data error)

Key to symbols	○	LED not illuminated
	✳	LED illuminated
	✳ 10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
	✳ 3 x	LED flashes three times, and this is then repeated
	X	Any state

After the cause has been remedied, faults can generally be reset by opening and closing the door. If the fault is still displayed afterward, use the reset function or briefly interrupt the power supply. Please contact the manufacturer if the fault could not be reset after restarting.

Important!

If you do not find the displayed device status in the System status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

System status table for version Unicode

Operating mode	Actuator/ door position	Safety outputs FO1A and FO1B	LED indicator output: STATE (green)	LED indicator output: DIA (red)	State
Normal operation	closed	on	✳	○	Normal operation, door closed
	closed	on	✳ flashes quickly 2 Hz	○	Normal operation, door closed, actuator in the boundary area ➡ Re-adjust door
	open	off	✳ 1 x	○	Normal operation, door open, no actuator taught
Teach-in standby	open	off	✳ 3 x	○	Door open, unit is ready for teach-in for another actuator (only short time after power-up)
Setup	closed	off	✳ 1 Hz	○	Teach-in operation
	X	off	○	○	Positive acknowledgment after completion of teach-in operation
Fault display	X	off	○	✳	Fault on the power supply (e.g. Switch-off pulse duration of clocked power supply too long)
	closed	off	✳ 3 x	✳	Defective actuator (e.g. fault in code or code not readable)
	X	off	✳ 4 x	✳	Output error (e.g. short circuits, loss of switching ability)
	X	off	✳ 5 x	✳	Internal fault (e.g. component faulty, data error)

Key to symbols	○	LED not illuminated
	✳	LED illuminated
	✳ 10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
	✳ 3 x	LED flashes three times, and this is then repeated
	X	Any state

After the cause has been remedied, faults can generally be reset by opening and closing the door. If the fault is still displayed afterward, briefly interrupt the power supply. Please contact the manufacturer if the fault could not be reset after restarting.

Important:

If you do not find the displayed device status in the System status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

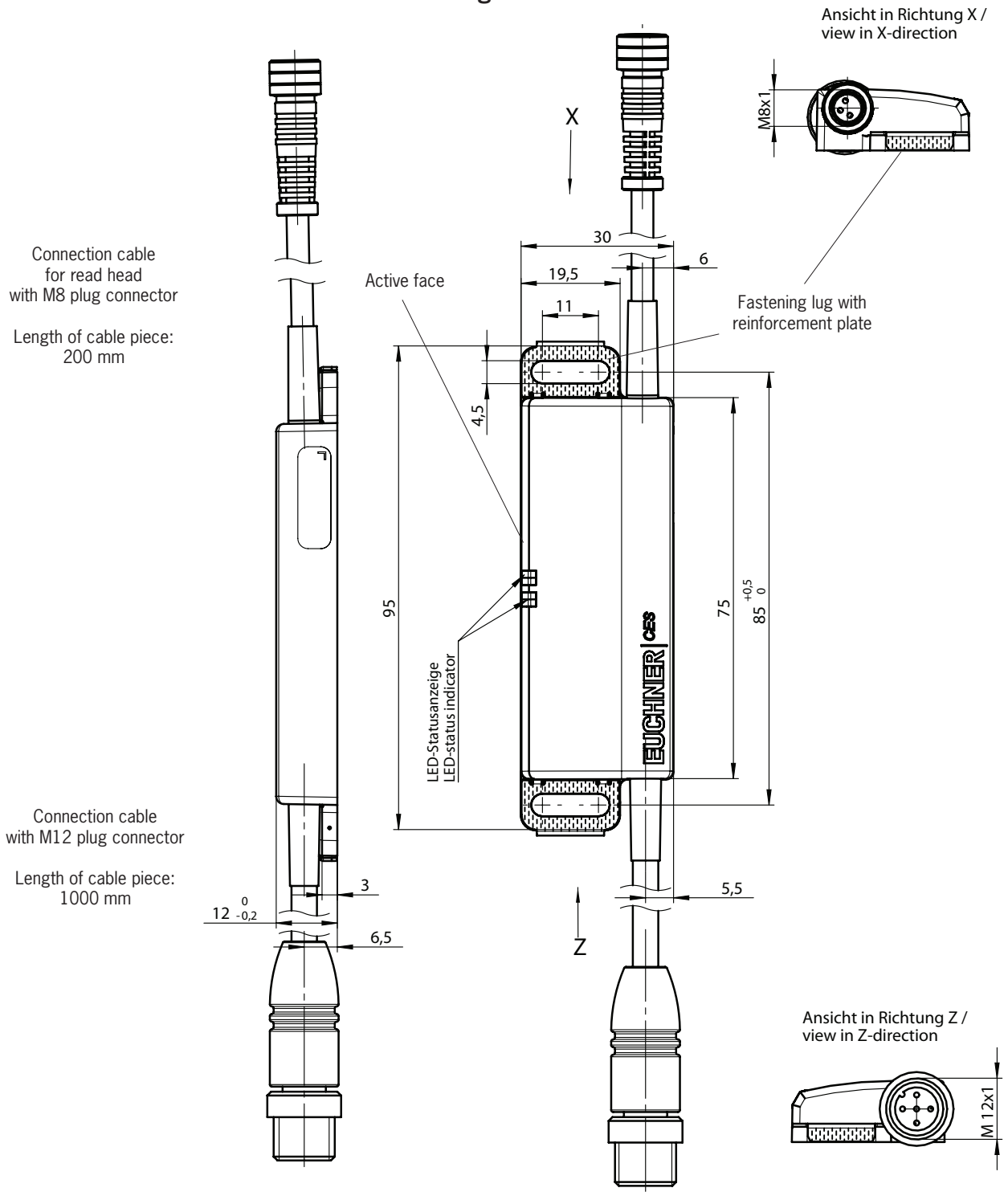
Dimension drawings and technical data

Field evaluation CES-FD-AP-.-01...

Note!

If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Dimension drawing CES-FD-AP-.-01...



Technical data CES-FD-AP-.-01...

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Plastic PBT			
Dimensions	95 x 30 x 12			mm
Weight	0.04			kg
Ambient temperature at U_B = DC 24 V				°C
- With connection cable with plug connector M12				
- Connection cable laid rigidly	- 20	-	+ 65	
- Connection cable movable	- 5	-	+ 65	
Degree of protection	IP 67			
Safety class	III			
Degree of contamination	3			
Installation position	Any			
Connection - Evaluation - Read head	Connection cable with plug connector M12x1, 5-pin Connection cable with plug connector M8x1, 3-pin			
Operating voltage U_B (reverse polarity protected, regulated, residual ripple < 5%) [1]	24 ± 15% (PELV)			V DC
For the approval according to cULus the following applies	Operation only with UL Class 2 power supply, or equivalent measure			
Current consumption	45			mA
External fuse (operating voltage)	0.25	-	8	A
Safety outputs FO1A/FO1B	Semiconductor outputs, p-switching, short circuit-proof			
- Output voltage U(FO1A)/U(FO1B) [1]				V DC
HIGH U(FO1A)	U_B-1.5	-	U_B	
HIGH U(FO1B)				
LOW U(FO1A)/U(FO1B)	0		1	
Switching current per safety output	1	-	150	mA
Utilization category according to EN IEC 60947-5-2	DC-13 24 V 150 mA Caution: outputs must be protected with a free-wheeling diode in case of inductive loads.			
Off-state current I_r	≤ 0.25			mA
Monitoring output OD	Semiconductor output p-switching, short circuit-proof			
- Output voltage	0.8 x U_B	-	U_B	V DC
- Max. load	-	-	50	mA
Rated insulation voltage U_i	-	-	75	V
Rated impulse withstand voltage U_{imp}	-	-	1.5	kV
Resilience to vibration	In acc. with EN IEC 60947-5-2			
Switching frequency	-	-	1	Hz
Repeat accuracy R	≤ 10			%
EMC protection requirements	In acc. with EN IEC 60947-5-3			
Reliability values acc. to EN ISO 13849-1				
Category	4			
Performance Level	PL e			
PFH_d	4.5 x 10^{-9} / h			
Mission time	20			years

1) The device tolerates voltage interruptions of up to 5 ms.
2) Values at a switching current of 50 mA without taking into account the cable length.

Typical system times

Ready delay: After switching on, the unit carries out a self-test. The system is ready for operation only after this time (0.5 s).

Switch-on time of safety outputs: The max. reaction time from the moment when the actuator is at the operating distance (safety door closed) to the moment when the safety outputs switch on T_{on} is 400 ms.

Risk time according to EN 60947-5-3: If an actuator moves outside the operating distance, the safety outputs FO1A and FO1B are deactivated after a maximum of 260 ms.

Difference time: The safety outputs FO1A and FO1B switch with a slight delay in relation to each other. They have the same signal state at the latest after a difference time of 10 ms.

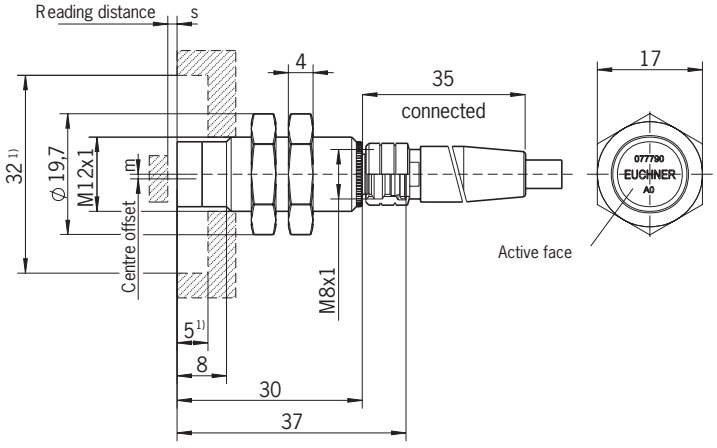
Test pulses at the safety outputs: The device generates its own clock signal on the output lines FO1A/FO1B. A downstream control system must tolerate these test pulses, which may have a duration of up to 0.4 ms.

This can usually be set up in the control systems by parameter assignment. If parameter assignment is not possible for your control system or if shorter test pulses are required, please contact our support organization.

Read head CES-A-LMN-SC

- Cylindrical design M12
- M8 plug connector (snap-action and screw terminals)

Dimension drawing



1) Clear zone (area of the active face without metal housing)

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Nickel-plated CuZn housing sleeve Plastic PBT GF20 cap			
Dimensions	M12 x 1, length 38			mm
Weight	0.2			kg
Ambient temperature	-20	-	+70	°C
Ambient pressure (only of active face in installed condition)	-	-	10	bar
Degree of protection	IP67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BMB on field evaluation unit CES-FD-AP-.-01-...				
Assured switch-off distance S_{ar}	-	-	10	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	5	-	
- Assured switch-on distance S_{ao}	3.4	-	-	
- Switching hysteresis	0.05	0.2	-	
Connection	M8 plug connector (snap-action and screw terminals), 3-pin			
Connection cable	-	-	0.7	m

1) These values apply for surface installation of the read head in steel.

Typical operating distance

(Only in combination with field evaluation unit CES-FD-AP-.-01-... and actuator CES-A-BMB)

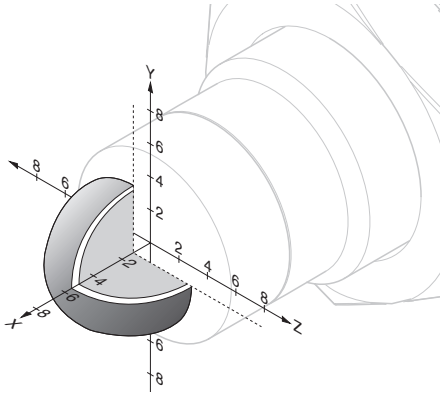


Figure 5: Typical operating distance

Note

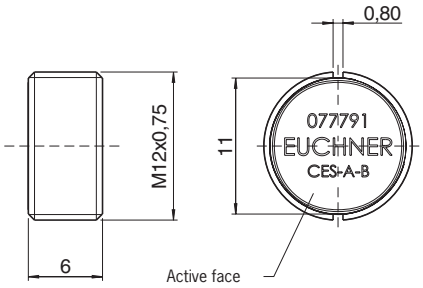
A minimum distance of s = 1.2 mm must be maintained.

The read distance may vary depending on the installation situation

Actuator CES-A-BMB

- Cylindrical design M12 x 75
- In combination with read head CES-A-LMN-SC
  (with read head CES-A-LNA.../LCA... operating distance on request)

Dimension drawing



Notes

- The actuator can be screwed into the M12 x 0.75 thread provided with the aid of an insertion tool (order no. 037 662).
- Flush installation of the actuator in steel is allowed.

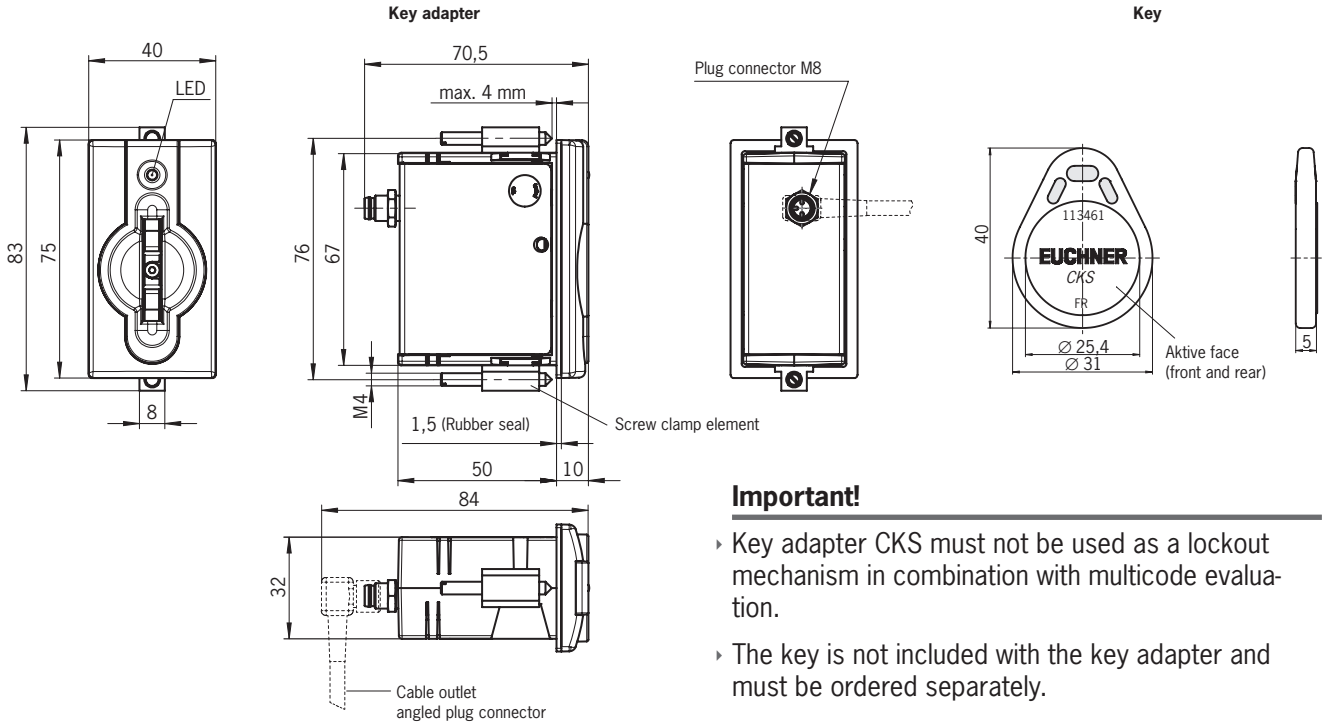
Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material	Stainless steel			
Dimensions	M12 x 0.75, depth 6			mm
Weight	0.002			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

Key adapter CKS

- Integrated CES read head
- M8 plug connector

Dimension drawing



Important!

- Key adapter CKS must not be used as a lockout mechanism in combination with multicode evaluation.
- The key is not included with the key adapter and must be ordered separately.

Technical Data

Parameter	Value			Unit
	min.	typ.	max	
Key adapter				
Housing material		Plastic (PA 6 GF30)		
Weight		0.13		kg
Ambient temperature	-20	-	+70	°C
Degree of protection		IP67 (in installed state)		
Installation position		On the front		
Mounting cut-out according to DIN 43700		33 x 68		mm
Operating distance [1]				mm
Assured switch-off distance s_{ar}	-	-	35	
Assured switch-on distance s_{ao}	2	-	-	
Switching hysteresis	-	1	-	
Connection to evaluation unit		Plug connector M8 (male socket, 3-pin)		
Cable length	-	-	0.7	m
LED indicator		white: valid key detected		
Key				
Housing material		Plastic (PC)		
Weight		0.004		kg
Ambient temperature	-20	-	+70	°C
Degree of protection acc. to IEC 60529		IP67		
Power supply		Inductive via read head		

1) Referred to the stop of the inserted key.

Ordering information and accessories

Designation	Version	Order no.
Field evaluation unit CES-FD-AP-M-01-USI-115534	Multicode, connection cable PUR with M12 plug connector, 5-pin, pin 5 not used	115534
Field evaluation unit CES-FD-AP-U-01-USI-119865	Unicode, connection cable PUR with M12 plug connector, 5-pin, pin 5 not used	119865
Extension for connection cable with M12 plug connector, 5-pin	5 m, PVC	100183
	10 m, PVC	100184
	20 m, PVC	100185
Extension for read head cable with M8 plug connector, 3-pin	0.4 m, PUR	115464
Read head CES-A-LMN-SC	M12x1, length 38 mm with plug connector M8, 3-pin	077790
Actuator CES-A-BMB	M12x0.25, depth 6 mm	077791
Insertion tool	For actuator CES-A-BMB	037662
Key adapter CKS-A-L1B-SC-113130	Screw clamp elements included	113130
Key CKS-A-BK1-RD-113461	for key adapter CKS, color red	113461

Inspection and service

Warning!

Loss of the safety function because of damage to the system.
In case of damage, the related component must be replaced completely.
Only accessories or spare parts that can be ordered from EUCHNER may be replaced.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:

- Check the switching function (see section *Functional check*)
- Check the secure fastening of the devices and the connections
- Check for soiling

No servicing is required; repairs to the device are only allowed to be made by the manufacturer.

Note!

The year of manufacture can be seen in the lower right corner of the rating plate. The current version number in the format (V X.X.X) can also be found on the device.

The safety door must be re-adjusted when the device indicates that the actuator is in the limit range.

Service

If service support is required, please contact:

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16

D-70771 Leinfelden-Echterdingen

Service telephone:

+49 711 7597-500

E-mail:

info@euchner.de

Internet:

www.euchner.de

Declaration of conformity

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Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

EG-Konformitätserklärung
EC-Declaration of Conformity
CE-Déclaration de Conformité
CE-Dichiarazione di conformità
CE-Declaración de Conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

109923-08 –10/13

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

I:	2006/42/EG	Maschinenrichtlinie
	2006/42/EC	*Machinery directive*
	2006/42/CE	*Directive Machines*
	2006/42/CE	*Direttiva Macchine*
	2006/42/CE	*Directiva de máquinas*
II:	2004/108/EG	EMV Richtlinie
	2004/108/EC	*EMC Directive*
	2004/108/CE	*Directive de Compatibilité électromagnétique*
	2004/108/CE	*Direttiva EMV*
	2004/108/CE	*Directiva CEM*

Die Schutzziele der Niederspannungsrichtlinie wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie eingehalten.
The safety objetives of the Low-Voltage Directive comply with Annex I, No. 1.5.1 of the Machinery Directive.
Les objectifs de sécurité de la Directive Basse Tension sont conformes à l'annexe I, No. 1.5.1 de la Directive Machines
Gli obiettivi di sicurezza della Direttiva Bassa Tensione sono conformi a quanto riportato all'allegato I, No. 1.5.1 della Direttiva Macchine.
Los objetivos de seguridad de la Directiva de Bajo Voltaje cumplen con el Anexo I, No. 1.5.1 de la Directiva de Máquinas

Folgende Normen sind angewandt:	a:	EN 60947-5-3:1999 + A1:2005
Following standards are used:	b:	EN 1088:1995+A2:2008
Les normes suivantes sont appliquées:	c:	EN ISO 13849-1:2008
Vengono applicate le seguenti norme:	d:	EN ISO 13849-2:2012
Se utilizan los siguientes estándares:	e:	EN 50295:1999 (AS-i)

Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norme* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Sicherheitsschalter *Safety Switches* *Interrupteurs de sécurité* *Finecorsa di sicurezza* *Interruptores de seguridad*	CES-AP-CL2-AH-SF CES-AP-CR2-AH-SF CES-AP-CL2-CH-SF CES-AP-CR2-CH-SF CES-AP-CL2-AH-SB CES-AP-CR2-AH-SB CES-AP-CL2-CH-SB CES-AP-CR2-CH-SB CES-AP-CL2-AH-Lxx CES-AP-CR2-AH-Lxx CES-AP-CL2-CH-Lxx CES-AP-CR2-CH-Lxx	I, II	a, b, c, d	ET 12056
	CES-AP-C01-CH-SA	I, II	a, b, c, d	ET 12084
	CES-AR-C01-AH-SA CES-AR-C01-CH-SA CES-AR-C01-EH-SA CES-AR-CL2-AH-SA CES-AR-CR2-AH-SA CES-AR-CL2-CH-SA CES-AR-CR2-CH-SA CES-AR-CL2-AH-SG CES-AR-CR2-AH-SG CES-AR-CL2-CH-SG CES-AR-CR2-CH-SG CES-AR-CL2-AH-Lxx CES-AR-CR2-AH-Lxx CES-AR-CL2-CH-Lxx CES-AR-CR2-CH-Lxx	I, II	a, b, c, d	ET 12084 ET 12066

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Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norme* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Betätiger *Actuator* *Actionneur* Azionatore *Actuador*	CES-A-BLN-L2 CES-A-BLN-R2 CES-A-BLN-U2 CES-A-BDN-06	I, II	a, b, c, d	ET 12056 ET 12066
	CES-A-BBA CES-A-BCA CES-A-BPA CES-A-BDA-20 CES-A-BRB CES-A-BRN	I, II	a, b, c, d	ET 12084 ET 10147

Benannte Stelle *Notified Body* *Organisme notifié* *Sede indicata* *Entidad citada*	NB 0340 DGUV Test Prüf- und Zertifizierungsstelle Fachausschuss Elektrotechnik Gustav-Heinemann-Ufer 130 50968 Köln Germany

Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norma* *Estándares*	**Prüfbericht** *Test report* *Rapport du test* *Rapporto di prova* *Informe de prueba*
Sicherheitsschalter *Safety Switches* *Interrupteurs de sécurité* *Finecorsa di sicurezza* *Interruptores de seguridad*	CES-AH-C.3...	I, II	a, b, c, d	Euchner QS PB 21/2010
	CES-AP-C.1...	I, II	a, b, c, d	Euchner QS PB 76/2010
	CES-I-AP...C04... CES-I-AR...C04...	I, II	a, b, c, d	UQS 116783 UQS 119733
	CES-I-AS2A...C04...	I, II	a, b, c, d, e	UQS 120552
	CES-FD-AP...	I, II	a, b, c, d	UQS 116784
Auswertegerät *Safety Unit* *Analyseur* *Centralina* *Unidad de evaluación*	CES-AR-AES-12	I, II	a, b, c, d	Euchner QS PB 53/2007

Leinfelden, Oktober 2013

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